

# इंटरनेट

# मानक

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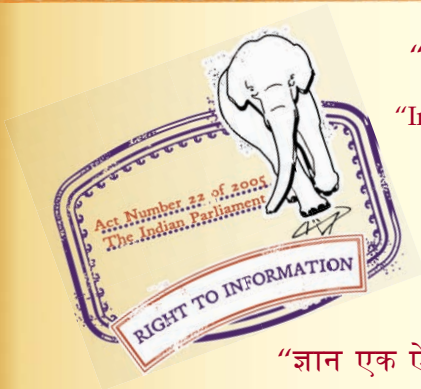
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IS 444 (1987): General purpose rubber water hose  
(Superseding IS 445 : 1964 and IS 913 : 1968) [PCD 13:  
Rubber and Rubber Products]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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**IS : 444 – 1987**  
**(Reaffirmed 2003)**

*Indian Standard*  
**SPECIFICATION FOR**  
**GENERAL PURPOSE RUBBER WATER HOSE**  
*(Fourth Revision)*

**Third Reprint AUGUST 2007**  
**(Including Amendment No. 1)**

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**BUREAU OF INDIAN STANDARDS**  
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**AMENDMENT NO. 1 APRIL 1997  
TO  
IS 444 : 1987 SPECIFICATION FOR GENERAL  
PURPOSE RUBBER WATER HOSE**

**( *Fourth Revision* )**

**( *Page 5, Table 1, col 5* )** — Substitute '1.50 mm' for '—' against Nominal Bore Sizes 25.00 mm to 100.00 mm .

**( PCD 13 )**

(Continued from page 1)

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# *Indian Standard*

## SPECIFICATION FOR GENERAL PURPOSE RUBBER WATER HOSE

### ( *Fourth Revision* )

#### 0. FOREWORD

**0.1** This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards on 5 October 1987, after the draft finalized by the Rubber Products Sectional Committee, had been approved by the Petroleum, Coal and Related Products Division Council.

**0.2** This standard was first published in 1953 and subsequently revised in 1964, 1968 and 1980. The second revision was amalgamated revision of IS : 444-1964\* and IS : 445-1964† covering both light and heavy duty hoses. Third revision was amalgamated revision of IS : 444-1968‡ and IS : 913 1968§ covering both woven and braided constructions.

**0.3** In this fourth revision, specific materials and design features have not been specified and only performance requirements have been specified to allow for future technological developments. Pressure requirements have been modified on the lines of recent thinking of ISO/TC 45 Rubber and Rubber Products of International Organization for Standardization (ISO). Further the requirements for accelerated ageing and adhesion have been modified.

**0.4** Water hose prescribed in this standard is intended for water delivery and is built on mandrels or are the moulded type. Water hoses covered by this standard are suitable for working pressure up to 2.5 MPa||. Only bore sizes with tolerances have been prescribed in this standard.

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\*Specification for water hose of rubber, low pressure with woven reinforcement (revised).

†Specification for water hose of rubber, high pressure with woven reinforcement (revised).

‡Specification for water hose of rubber with woven textile reinforcement (second revision).

§Specification for water hose of rubber with braided textile reinforcement (second revision).

|| 1 MPa = 1 MN/m<sup>2</sup> = 10.2 kgf/cm<sup>2</sup>.

**0.5** This standard contains clauses 4.1.3.1, 4.1.4, 4.2.1 and 7.1 which call for an agreement between the purchaser and the supplier.

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## **1. SCOPE**

**1.1** This standard prescribes the requirements, methods of sampling and test for rubber water hose suitable for working pressure up to 2.5 MPa.

## **2. TERMINOLOGY**

**2.1** For the purpose of this standard, the definitions given in various parts of IS : 7503\* shall apply.

## **3. TYPES**

**3.1** This standard prescribes three types of hoses as follows:

- a) *Type 1* — For a working pressure of 0.60 MPa,
- b) *Type 2* — For a working pressure of 1.00 MPa,
- c) *Type 3A* — For a working pressure of 2.5 MPa, and
- d) *Type 3B* — For a working pressure of 2.5 MPa; with oil resistant cover for car washing and similar purposes.

## **4. REQUIREMENTS**

### **4.1 Construction**

**4.1.1 Lining** — A rubber inner lining, smooth in bore.

**4.1.2 Reinforcement** — A reinforcement of natural or synthetic fibres applied by a suitable technique.

**4.1.3 Cover** — A rubber cover.

**4.1.3.1** The lining and cover shall be of uniform thickness, reasonably concentric and free from air blisters, porosity and splits.

**NOTE** — The purchaser while placing the order should specify the type of reinforcement required by him.

**4.1.4** As required for the purchaser, hose of nominal bore not greater than 38 mm may be mandrel or non-mandrel made; hose of nominal bore above 38 mm shall be mandrel made. The finish may be smooth, fluted or fabric marked.

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\*Glossary of terms used in rubber industry.



## 4.2 Dimensions and Tolerances

**4.2.1 Bore Size** — The bore size, when measured according to the method prescribed in 4.2.1.2 of IS : 443-1975\*, shall be as given in Table 1. Other sizes within this range may be supplied by agreement between the purchaser and the supplier. The tolerance shall be those of the previous smaller size.

**4.2.2 Lining and Cover Thickness** — The thickness of the lining and the cover of the hose, when measured according to the method prescribed in 4.2.2 of IS : 443 - 1975\*, shall be not less than that specified in Table 1.

**TABLE 1 BORE SIZES AND TOLERANCES AND MINIMUM THICKNESS OF LINING AND COVER**

NOMINAL BORE SIZE	TOLERANCE ON NOMINAL BORE SIZE	MINIMUM THICKNESS OF LINING	MINIMUM THICKNESS OF COVER	
			Types 1 and 2 ( 4 )	Type 3 ( 5 )
( 1 )	( 2 )	( 3 )	mm	mm
mm	mm	mm		
10·00	± 0·75	1·50	1·00	1·50
12·50	± 0·75	1·50	1·00	1·50
16·00	± 0·75	1·50	1·00	1·50
20·00	+ 0·75 — 1·25	1·50	1·00	1·50
25·00	± 1·25	2·00	1·00	—
31·50	± 1·25	2·00	1·00	—
38·00	± 1·50	2·00	1·00	—
45·00	± 1·50	2·50	1·00	—
50·00	± 1·50	2·50	1·00	—
56·00	± 1·50	2·50	1·00	—
63·00	± 1·50	2·50	1·00	—
75·00	± 2·00	2·50	1·00	—
100·00	± 2·00	2·50	1·00	—

NOTE — In case of fluted hose, the cover thickness shall correspond to the measurement made at a point where the thickness of fluting is included therein, and that the depth of the flute should not exceed 0·5 mm.

**4.2.3** The tolerance on any hose length shall be  $\pm 1$  percent.

\*Methods of sampling and test for rubber hoses ( second revision ).

### 4.3 Requirements of Physical Tests on Finished Hose

**4.3.1 Tensile Strength and Elongation at Break of Lining and Cover —** The tensile strength and elongation at break of rubber used for lining and cover of the hose when tested in accordance with the method prescribed in 5 of IS : 443-1975\*, shall comply with the requirements shown in Table 2.

**TABLE 2 TENSILE STRENGTH AND ELONGATION AT BREAK**

HOSE TYPE		TENSILE STRENGTH	ELONGATION AT BREAK,
		Min (2) MPa	Min (3) Percent
(1)			
1 and 2	Lining } Cover }	50	250
3	Lining } Cover }	7.0	250 300

**4.3.2 Accelerated Ageing Test —** After ageing at  $70 \pm 1^\circ\text{C}$  for a period of 72 hours, in accordance with the method prescribed in 6 of IS : 443-1975\*, the rubber used for lining of all types of hoses and for the cover of Types 1, 2 and 3A shall not vary by more than  $\pm 25$  percent for tensile strength and  $+10, -30$  percent for elongation at break of the corresponding values obtained before ageing.

**4.3.2.1** After ageing at a temperature of  $100 \pm 1^\circ\text{C}$  for a period of 72 hours in accordance with the method prescribed in 6 of IS : 443-1975\*, the rubber used in the cover of the hose Type 3B shall not vary by  $\pm 25$  percent for tensile strength and  $+10, -30$  percent for elongation at break of the corresponding values obtained before ageing.

**4.3.3 Swelling Test —** The cover of hose Type 3B, after immersion in the test liquid (mixture of 30 parts of toluene and 70 parts of *iso*-octane) when tested according to method prescribed in IS : 3400 (Part 6) - 1983† shall not change in volume by more than  $+100$  percent.

### 4.4 Performance Requirements

**4.4.1 Adhesion —** When tested in accordance with the method prescribed in Method A of IS : 3400 (Part 5) - 1986‡ the minimum value between the lining and reinforcement, between layers and between cover and reinforcement, shall not be less than  $1.5 \text{ kN/m}$ .

\*Methods of sampling and test for rubber hoses (second revision).

†Methods of test for vulcanized rubbers: Part 6 Resistance to liquids (first revision).

‡Methods of test for vulcanized rubbers: Part 5 Adhesion of rubbers to textile fabrics (second revision).

**4.4.2 Pressure Requirements** — When tested in accordance with the method prescribed in 8 of IS : 443-1975\* the hose shall comply with the requirements given in Table 3, and shall show no leakage, rupture or porosity, at proof pressure.

**TABLE 3 REQUIREMENTS OF HYDROSTATIC PRESSURE TESTS**

TYPE	PROOF PRESSURE <i>Min</i>	CHANGE IN DIAMETER AT PROOF PRESSURE	CHANGE IN LENGTH AT PROOF PRESSURE	MINIMUM BURSTING PRESSURE
(1)	(2)	(3)	(4)	(5)
	MPa*	Percent	Percent	MPa*
1	0.96	± 7	± 7	1.90
2	1.60	± 7	± 7	3.15
3A } and 3B }	4.00	± 7	± 7	8.00

\*1 MPa = 10.2 kgf/cm<sup>2</sup>.

## 5. MARKINGS

**5.1** Each length of the hose shall bear the following information:

- Manufacturer's name or trade-mark,
- Number of this specification,
- Hose type,
- Nominal bore size,
- Design working pressure, and
- Quarter and the year of manufacture.

**5.1.1** For long length, moulded type of hose, the above markings shall be made at intervals of approximately 10 metres.

**5.1.2** Each length of hose may also be marked with the Standard Mark.

**NOTE** — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

\*Methods of sampling and test for rubber hoses ( *second revision* ).

## **6. SAMPLING AND CRITERIA FOR CONFORMITY**

**6.1** For the purpose of ascertaining the conformity of the hose in a consignment to this specification, the scale of sampling and the criteria for conformity shall be as prescribed in 3 of IS : 443-1975\*.

## **7. TESTS**

**7.1** Unless otherwise agreed to between the purchaser and the supplier, all the tests shall be carried out within three months from the date of receipt of the material by the purchaser.

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\*Methods of sampling and test for rubber hoses ( *second revision* ).

( Continued from page 2 )

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